Patent Application
Serial No. 09/148,749
Attorney Docket No. PC-3201

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#8

Group Art Unit 1742	:	
In re Application of	:	
GAYLORD D. SMITH ET AL.	:	ADVANCED HIGH TEMPERATURE CORROSION RESISTANT ALLOY
Serial No. 09/148,749	:	
Filed September 4, 1998	:	
Examiner - Tamara Gray	:	

DECLARATION OF GAYLORD D. SMITH UNDER 37 C.F.R. §1.132

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, GAYLORD DARRELL SMITH, a co-inventor of the instant invention, hereby declare the following:

1. I am a United States citizen residing at 120 Stamford Park Drive, Huntington, West Virginia 25705.

2. I have been employed by Special Metals Corporation and its predecessor corporation, Inco Alloys International, Inc., of Huntington, West Virginia (and its predecessors) for 32 years. Currently, I hold the title of Technical Manager - Product Development.

3. I have received a B.S. degree in soil chemistry and an M.S. degree in metallurgy from Iowa State University and an MBA from New York University. I have worked in the metallurgy art for 42 years. During this time I have been a named inventor of over 30 United States patents involving the subject matter of Ni-base alloys. A list of these patents through 1995 is included in my curriculum vitae attached hereto.

4. I have reviewed the Office Action dated April 26, 2000, in connection with the above-captioned patent application, as well as the prior art references cited therein. Claims 1-19 have been rejected as being obvious to one of ordinary skill in the art over U.S. Patent No. 5,780,116 to Sileo et al. (hereinafter "Sileo et al."). In support of this conclusion, the Examiner states that Sileo et al. teaches a nickel base superalloy that comprises a number of alloy constituents that purportedly overlap the claimed ranges of pending claims 1-19 of the instant application.

5. I disagree with the Examiner's position that the claimed invention would have been obvious to one of ordinary skill in the art over Sileo et al.

6. I have studied the compositional ranges of the so-called nickel base alloy relied upon by the Examiner and set forth in column 7, lines 48-59 of Sileo et al. I have added all of the maximum amounts of the listed alloy constituents (except Ni) and find that these enumerated alloy (less Ni) constituents total 115.1%. Bearing in mind that the Sileo et al. alloy has a "balance essentially nickel," there can be no Ni present in the Sileo et al. alloy when all of the other constituents are present in their maximum amounts. Conversely, I have added all of the minimum amounts of these same listed alloy constituents (except Ni) and find that these total 8.1%, thus leaving a balance of 91.9% Ni. Hence, the so-called nickel base alloy taught by Sileo et al. and relied upon by the Examiner has a Ni range of 0-91.9%.

7. I conclude that the above disclosure of Sileo et al. set forth in column 7, lines 48-59 and subsequently adopted by the Examiner, is meaningless and non-enabling to persons skilled in the art due to the undue breadth of the constituent ranges. The only nickel base alloy ranges disclosed in Sileo et al. which would have any meaning to persons skilled in the art are those set forth in Table 1 in column 7, lines 19-44, identified as Alloy 1, Alloy 2 and Alloy 3. In reviewing the three alloy compositions of Table 1 of Sileo et al., it is apparent that the

minimum and maximum ranges for each element of the broad composition set forth in column 7, lines 48-59 and relied upon by the Examiner, were selected from the minimum and maximum values for a given constituent in Alloys 1, 2 and 3 of Table 1 taken collectively. Clearly, this is improper and meaningless since each of the alloy compositions 1, 2 and 3 of Table 1 of Sileo et al. represents a unique composition with specific combinations and amounts of alloying constituents present (or not present) in each alloy. One skilled in the art would not then establish broad compositional limits for an alloy by combining the maximum and minimum values of three unique alloy compositions as was done in column 7, lines 48-59 of Sileo et al., because the resultant combined composition is fictitious, as evidenced by the fact that the maximum amount of alloy constituents (without Ni) totals 115.1% in the so-called Ni base alloy composition of Sileo et al. as set forth above.

8. I have compared the alloy ranges of Alloys 1-3 of Table 1 of Sileo et al. with pending claims 1-19 and believe that only Alloy 2, having a chromium content of 24.00 - 26.00%, bears any relevance with respect to the Cr content of 21.5-28% of claim 1 of the instant application. The balance of the major constituents of the compositions of the invention do not overlap, however, with Sileo et al.'s Alloy 2. More specifically, claim 1 of the instant application requires, *inter alia*, 12-18% Co, 4-9.5% Mo, 2-3.5 Al, while Sileo et al. Alloy 2 contains no Co, no Mo and 5.5-6.5 Al. Alloys 1 and 2 listed in Table 1 of Sileo et al. are not relevant to the instant claims since there is no overlap in the critical Cr range.

9. It is overwhelmingly clear to me that the alloys of Sileo et al. do not suggest the claimed compositions of the present invention. In my opinion, the present invention as defined in claims 1-19 is unobvious over the disclosure of Sileo et al.

10. Furthermore, the alleged invention of Sileo et al. resides in a method of making an abradable seal in which a plasma sprayed bond coat made from a metal powder forms

a matrix for a composite containing 20-45 volume % of boron nitride which is also deposited as a thin film on the bond coat by plasma spraying. The compositional limits of the bond coat are the broad ranges set forth in column 7, lines 48-59 of Sileo et al. discussed above. The Sileo et al. disclosure is directed to a composition which is in powder form which is merely plasma sprayed to form a surface coating, thus, hot and cold workability is not required as is required in the present invention. In my opinion, persons skilled in the art who were interested in obtaining a wrought, nickel base alloy to which the present invention pertains would not look to the plasma sprayed powder composite of Sileo et al.

11. It must also be noted that in claim 1 of the present application, Mo is present in the amount of 4.5 to 9.5% whereas in Sileo et al., Mo is optimally present in an amount 0-4.0%. Mo in the present invention is critical in the claimed range, contributing to solid solution strengthening and improved protective scale performance at intermediate temperatures. This claimed critical range for Mo is not suggested by Sileo et al., further evidencing the non-obviousness nature of the present invention.

12. It will also be noted that Ti is an optional element from 0 to 5% in Sileo et al. which closely specified at 0.05 to 2.0% in claim 1 for the purpose of deoxidation during manufacture and as a carbide (TiC) former which acts as a grain stabilizer during manufacture and service. The upper limit of 2.0% for Ti in claim 1 serves to limit the volume % of gamma double prime that may form at intermediate temperatures which is, likewise, not recognized or suggested in Sileo et al., also evidencing the non-obvious advance of the presently claimed invention.

This Declaration represents my good faith professional opinion. I am aware that willful false statements and the like are punishable by fine or imprisonment or both under 18 U.S.C. §1001 and may jeopardize the validity of the application or any patent issuing thereon.

All statements made of my own knowledge are true and all statements made on information and belief are believed to be true.

Respectfully submitted,

Date: 8/25/00

Gaylord D. Smith

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GAYLORD D. SMITH
SENIOR RESEARCHER

EDUCATION:

B.S. Chemistry , Iowa State University, 1952
M.S. Metallurgy, Iowa State University, 1958
M.B.A. New York University, 1972

MANAGEMENT TRAINING:

Industrial Research Management Course at Harvard Business School, 1976
Four-week Management Course at American Management Association, 1977

EXPERIENCE:

1952-1957 USAF (Captain), Air Weather Service

1957-1958 Instructor, Department of Mechanical Engineering, Iowa State University

1958-1968 Research Metallurgist, DuPont Company

1968-1969 Product Development Engineer, International Nickel Company

1969-1970 Product Development Manager for Platinum Metals

1970-1971 Product Development Manager for Nickel Alloys

1972-1974 Product Development Manager for Powder Metallurgy

1974-1984 Development Manager for New Vertures

1984-1989 Senior Metallurgist, High Temperature Corrosion, Inco Alloys International

1989-Present Senior Researcher, High Temperature Corrosion, Inco Alloys International

Publications and Patents:

Over One Hundred technical publications and presentations. Co-editor of four volumes in powder metallurgy. Thirty six U.S. patents (issued and pending). See attachments.

GAYLORD D. SMITH
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AFFILIATIONS:

American Society for Metal International
- Delaware Chapter Publicity Chairman (1960)
- ASM Technical Awareness Committee (1975-78)
- Contributor of "Technical Forecasts" to ASM (1975-78)
- ASM Phase Diagram Committee (1987 to present)
- Co-author of chapter in Vol. 13 "Corrosion" on Corrosion of Noble Metals (1987)
- Selected ASM Fellow (1991)

The National Association of Corrosion Engineerers

American Powder Metallurgy Institute
- National Chairman of America Powder Metallurgy Institute Conference (1975)
- Co-Chairman of American Powder Metallurgy Institute International Conference (1980)
- Member of Metal Powder Industries Federation "Technical Board" (1972-80)

Member of the founding Board of Directors for the International Precious Metal Institute (1968)

Member of the Technical Board of the Selenium-Tellurium Development Association (1975-1981)

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GS 54 A NEW GAS TURBINE HOT GAS PATH ALLOY, GANESAN, SMITH, YATES.

GS 55 EFFECT OF GRAIN SIZE, MICROSTRUCTURE, TEST TEMPERATURE, AND FREQUENCY ON THE LOW CYCLE FATIGUE PROPERTIES OF INCONEL ALLOY 617 , MANNAN, SMITH WILSON.

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GS 75. EFFECT OF SIMULATED ENVIRONMENTS ON OXIDE SCALE FORMATION OF CANDIDATE COMBUSTOR ALLOYS, SMITH, GANESAN, TILLACK AND WAGNER.

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GS 79. SUPERPLASTIC FORMING OF INCONEL ALLOY 718SPF BY SMITH & YATES, SAMPE, ADVANCEMENTS IN SYNTHESIS AND PROCESSES, OCT, 1992.

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GS 81. LABORATORY EVALUATION OF FOUR CANDIDATE ALLOYS FOR FLUIDIZED BED COAL COMBUSTORS, GANESAN AND SMITH ASM '88.

GS 82. GRAIN SIZE, TEMPERATURE AND THEIR RELATIONSHIP TO THE LWO CYCLE FATIGUE PROPERTIES OF INCONEL ALLOY 617 BY SMITH, YATES, MANNAN, TMS, MARCH 1992.

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GS 85. ALLOY OPTIMIZAION FOR ENHANCED FLEXIBLE COUPLING PERFORMANCE, G. D. SMITH, CRUM AND SMITH, SAE, FEB '96.

GS 86. Tailoring Mill Practice to Maximize Intermediate Temperature Properties of Nickel-Based Alloys, G. Smith, Flower, ASM-TMS.

GS 87. Corrosion Resistance of Nickel-Containing Alloys in Petrochemical Environments by G. D. Smith.

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